DATA EVALUATION RECORD
VEGETATIVE VIGOR EC_{25} TEST
§123-1 (b) (TIER II)

1. **CHEMICAL:** Pyraclostrobin — PC Code No.: 099100

2. **TEST MATERIAL:** BAS 500 00 F — Purity: 250 g BAS 500 F/L

3. **CITATION:**

Authors: Oberwalder, C. and O. Schmidt

Title: Effects on Non-Target Plants in the Greenhouse - A Limit Test

Study Completion Date: January 31, 2000

Laboratory: BASF Aktiengesellschaft, BASF Agricultural Center Limburgerhof, Crop Protection Division, Ecology and Environmental Analytics, P.O. Box 120, D-67114 Limburgerhof, Germany

Sponsor: BASF Corporation, Agricultural Products, P.O. Box 13528, Research Triangle Park, NC 27709-3528

Laboratory Report ID: 67673

MRID No.: 45488601

DP Barcode: D277724

4. **REVIEWED BY:** Mary Thomas, Staff Scientist, Dynamac Corporation

Signature: Mary Thomas **Date:** 4/12/02

APPROVED BY: Teri Myers, Ph.D., Staff Scientist, Dynamac Corporation

Signature: Teri Myers **Date:** 4/12/02

5. **APPROVED BY:** Santhini Ramasamy, Environmental Scientist, OPP/EFED/ERBI

Signature: Santhini Ramasamy **Date:** 1.63.03

6. STUDY PARAMETERS:

Scientific Name of Test Organism: *Brassica napus, Pisum sativum, Daucus carota, Zea mays, Avena sativa, and Allium cepa*

Age or Size of Test Organism: Seedling

Definitive Study Duration: 14 days

Type of Concentration: Nominal

7. CONCLUSIONS:

Three dicotyledonous plant species (carrot, oil seed rape and pea) and three monocotyledonous plant species (corn, oat and onion) were exposed to BAS 500 00 F at nominal concentrations of 640 and 1920 ml formulated product/Ha (0.14 and 0.43 lb a.i./A) for 14 days; the highest concentration approximately close to the maximum recommended use rate of 0.5 lb a.i./acre. There were slight reductions in fresh weight and phytotoxic symptoms for some species (e.g., rape, pea, corn), but none of these effects were statistically significant. Therefore, no species or endpoints showed sensitivity to BAS 500 00 F at the levels tested in this study. The NOEC was ≥0.43 lb a.i./A and the LOEC was >0.43 lb a.i./A.

This limit test is scientifically valid and is classified as **Supplemental.**

Most sensitive monocot: None
Most sensitive parameter: None
EC_{25}: >0.43 lb a.i./A
NOEC: ≥0.43 lb a.i./A

Most sensitive dicot: None
Most sensitive parameter: None
EC_{25}: >0.43 lb a.i./A
NOEC: ≥0.43 lb a.i./A

8. ADEQUACY OF THE STUDY:

A. Classification: Supplemental

B. Rationale: This study was conducted as a limit test. Only 6 (instead of 10) species were tested, at only two treatment levels. Furthermore, the only parameters assessed were

phytotoxicity and fresh weight. US EPA requires the measurement of shoot length and dry plant weight.

C. Repairability: None.

9. GUIDELINE DEVIATIONS:

1. Only six species were tested in this study. US EPA currently requires the testing of 10 plant species (6 dicots and 4 monocots).

2. This study was conducted as a limit test, so plants were exposed to only two treatment levels, as opposed to the five levels recommended by US EPA.

3. The only parameters measured were phytotoxicity and fresh weight. US EPA currently requires the measurement of shoot length and dry plant weight.

10. SUBMISSION PURPOSE: This study was submitted to provide limit test data on the toxicity of BAS 500 00 F to the vegetative vigor of nontarget terrestrial plants for the purposes of chemical registration.

11. MATERIALS AND METHODS:

A. Test Organisms

Guideline Criteria	Reported Information
Species: 6 dicots in 4 families, including soybean and a rootcrop; 4 monocots in 2 families, including corn.	Dicots: Oil seed rape, pea and carrot Monocots: Maize, oats and onion
Number of plants per repetition:	3 (rape, pea, and maize), 4 (carrot and oat), and 5 (onion)
Source of seed and historical % germination of seed:	BASF Agricultural Center Limburgerhof Historical % germination of seed: Not reported

B. Test System

Guideline Criteria	Reported Information
Solvent:	Deionized water
Site of test:	Greenhouse
Planting method/type of pot:	Plastic pots (8.4 cm diameter, 7 cm height) filled with loamy sand (organic carbon 2.7%, pH 6.7%) .
Method of application:	Boom sprayer
Method of watering:	Not reported
Growth stage at application:	Seedlings

C. Test Design

Guideline Criteria	Reported Information
Dose range: 2x or 3x	3x
Doses: At least 5	Nominal application rate: 160 and 480 g a.i./ha 0.14 and 0.43 lb/A
Controls: Negative and solvent	Negative
Replicates per dose: At least 3	4
Test duration: 14 days	14 days
Were observations made at least weekly?	Fresh shoot weight observations were made at 14 days posttreatment. Phytotoxicity ratings were recorded at 7, and 14 days posttreatment.
Maximum dosage rate:	0.43 lb/A

12. REPORTED RESULTS:

Guideline Criteria	Reported Information
Quality assurance and GLP compliance statements were included in the report?	GLP compliance statement was provided, but a quality assurance statement was not provided.
Was a NOEC observed for each species?	Yes
Phytotoxic observations:	Yes
Were initial chemical concentrations measured? (Optional)	No
Were adequate raw data included?	Yes

Results for the most sensitive parameter of each species

Results Synopsis

Morphological Observations

Carrot: In the 0.14, and 0.43 lb a.i./A treatment groups, there was no significant reduction in the fresh shoot weight, compared to the control group. Slight phytotoxic symptoms (5% mean damage) of the seedlings were observed in the 0.43 lb a.i./A treatment group by 14 days.

Oil seed rape: By 14 days, the mean fresh shoot weight of the 0.14 and 0.43 lb a.i./A treatment groups were inhibited by 14.6, and 6.7%, respectively, compared to the control group. Minor phytotoxic symptoms (14% mean damage) of the seedlings were observed in the 0.43 lb a.i./A treatment group by 7 days.

Pea: By 14 days, the mean fresh shoot weight of the 0.14 lb a.i./A treatment group was inhibited by 5.0%, compared to the control group. In the 0.43 lb a.i./A treatment group, there was no reduction in the fresh shoot weight, compared to the control group. Slight phytotoxic symptoms (6% mean damage) of the seedlings were observed in the 0.43 lb a.i./A treatment group by 14 days.

Corn: By 14 days, the mean fresh shoot weight of the 0.14 and 0.43 lb a.i./A treatment groups were inhibited by 1.4, and 1.9%, respectively, compared to the control group. Minor phytotoxic symptoms (14% mean damage) of the seedlings were observed in the 0.43 lb a.i./A treatment group by 7 days.

Oat: By 14 days, the mean fresh shoot weight of the 0.14 and 0.43 lb a.i./A treatment

groups were inhibited by 4.4, and 2.2%, respectively, compared to the control group. No phytotoxic symptoms of the seedlings were observed in the 0.14 and 0.43 lb a.i./A treatment groups by 7 and 14 days.

Onion: By 14 days, the mean fresh shoot weight of the 0.14 lb a.i./A treatment group was inhibited by 0.1%, compared to the control group. In the 0.43 lb a.i./A treatment group, there was no reduction in the fresh shoot weight, compared to the control group. No phytotoxic symptoms of the seedlings were observed in the 0.14 and 0.43 lb a.i./A treatment groups by 7 and 14 days.

Statistical Results

Statistical Method: Fresh biomass was analyzed using ANOVA, followed by Dunnett's test to determine differences from the control using SAS software release 6.12.

Most sensitive monocot: None
Most sensitive parameter: None
EC_{25}: >0.43 lb a.i./A
NOEC: ≥0.43 lb a.i./A

Most sensitive dicot: None
Most sensitive parameter: None
EC_{25}: >0.43 lb a.i./A
NOEC: ≥0.43 lb a.i./A

13. REVIEWER'S VERIFICATION OF STATISTICAL RESULTS:

Statistical Method: Fresh biomass was analyzed using ANOVA, followed by Dunnett's test to determine differences from the control using TOXSTAT software.

Most sensitive monocot: None
Most sensitive parameter: None
EC_{25}: >0.43 lb a.i./A
NOEC: ≥0.43 lb a.i./A

Most sensitive dicot: None
Most sensitive parameter: None
EC_{25}: >0.43 lb a.i./A
NOEC: ≥0.43 lb a.i./A

14. REVIEWER'S COMMENTS:

The reviewers conclusions were identical to the study authors'. No species or endpoints showed sensitivity to BAS 500 00 F at the levels tested in this study. This study provides useful preliminary information on the toxicity of BAS 500 00 F to nontarget terrestrial plant species.

This study was conducted in accordance with USEPA Good Laboratory Practice Standards. A Quality Assurance Statement was not included.

15. OUTPUT OF REVIEWER'S STATISTICAL RESULTS:

carrot fresh weight
File: 8601cw Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	2	32.651	16.326	1.073
Within (Error)	9	136.898	15.211	
Total	11	169.549		

Critical F value = 4.26 (0.05,2,9)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

carrot fresh weight
File: 8601cw Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	control	19.905	19.905		
2	640	22.105	22.105	-0.798	
3	1920	23.940	23.940	-1.463	

Dunnett table value = 2.18 (1 Tailed Value, P=0.05, df=9,2)

carrot fresh weight
File: 8601cw Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	control	4			
2	640	4	6.012	30.2	-2.200
3	1920	4	6.012	30.2	-4.035

carrot fresh weight
File: 8601cw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	4	19.905	19.905	19.905

2	640	4	22.105	22.105	22.105
3	1920	4	23.940	23.940	23.940

carrot fresh weight
File: 8601cw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
control	19.905				
640	22.105	0.798		1.83	k= 1, v= 9
1920	23.940	1.463		1.93	k= 2, v= 9

s = 3.900
Note: df used for table values are approximate when v > 20.

rape fresh weight
File: 8601rw Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	2	88.371	44.186	0.908
Within (Error)	6	292.090	48.682	
Total	8	380.462		

Critical F value = 5.14 (0.05,2,6)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

rape fresh weight
File: 8601rw Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	control	52.420	52.420		
2	640	44.753	44.753	1.346	
3	1920	48.907	48.907	0.617	

Dunnett table value = 2.34 (1 Tailed Value, P=0.05, df=6,2)

rape fresh weight
File: 8601rw Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	control	3			
2	640	3	13.331	25.4	7.667
3	1920	3	13.331	25.4	3.513

rape fresh weight
File: 8601rw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	3	52.420	52.420	52.420
2	640	3	44.753	44.753	46.830
3	1920	3	48.907	48.907	46.830

rape fresh weight
File: 8601rw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
control	52.420				
640	46.830	0.981		1.94	k= 1, v= 6
1920	46.830	0.981		2.06	k= 2, v= 6

s = 6.977
Note: df used for table values are approximate when v > 20.

pea
File: 8601pw Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	2	7.352	3.676	0.285
Within (Error)	9	116.056	12.895	
Total	11	123.408		

Critical F value = 4.26 (0.05,2,9)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

pea
File: 8601pw Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	control	30.563	30.563		
2	640	29.020	29.020	0.607	
3	1920	30.778	30.778	-0.085	

Dunnett table value = 2.18 (1 Tailed Value, P=0.05, df=9,2)

pea
File: 8601pw Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	control	4			
2	640	4	5.535	18.1	1.542
3	1920	4	5.535	18.1	-0.215

pea
File: 8601pw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	4	30.563	30.563	29.791
2	640	4	29.020	29.020	29.791
3	1920	4	30.778	30.778	30.778

pea
File: 8601pw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
control	29.791				
640	29.791	0.304		1.83	k= 1, v= 9
1920	30.778	0.085		1.93	k= 2, v= 9

s = 3.591
Note: df used for table values are approximate when v > 20.

corn fresh weight
File: 8601nw Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	2	2.969	1.484	0.045
Within (Error)	9	300.041	33.338	
Total	11	303.010		

Critical F value = 4.26 (0.05,2,9)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

corn fresh weight
File: 8601nw Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	control	61.595	61.595		
2	640	60.743	60.743	0.209	
3	1920	60.415	60.415	0.289	

Dunnett table value = 2.18 (1 Tailed Value, P=0.05, df=9,2)

corn fresh weight
File: 8601nw Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	control	4			
2	640	4	8.900	14.4	0.852
3	1920	4	8.900	14.4	1.180

corn fresh weight
File: 8601nw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	4	61.595	61.595	61.595
2	640	4	60.743	60.743	60.743
3	1920	4	60.415	60.415	60.415

corn fresh weight
File: 8601nw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
control	61.595				
640	60.743	0.209		1.83	k= 1, v= 9
1920	60.415	0.289		1.93	k= 2, v= 9

s = 5.774
Note: df used for table values are approximate when v > 20.

oat fresh weight
File: 8601ow Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	2	1.702	0.851	0.237
Within (Error)	9	32.259	3.584	
Total	11	33.961		

Critical F value = 4.26 (0.05,2,9)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

oat fresh weight
File: 8601ow Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	control	20.765	20.765		
2	640	20.310	20.310	0.340	
3	1920	19.842	19.842	0.689	

Dunnett table value = 2.18 (1 Tailed Value, P=0.05, df=9,2)

oat fresh weight
File: 8601ow Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

	NUM OF	Minimum Sig Diff	% of	DIFFERENCE

GROUP	IDENTIFICATION	REPS	(IN ORIG. UNITS)	CONTROL	FROM CONTROL
1	control	4			
2	640	4	2.918	14.1	0.455
3	1920	4	2.918	14.1	0.923

oat fresh weight
File: 8601ow Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	4	20.765	20.765	20.765
2	640	4	20.310	20.310	20.310
3	1920	4	19.842	19.842	19.842

oat fresh weight
File: 8601ow Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
control	20.765				
640	20.310	0.340		1.83	k= 1, v= 9
1920	19.842	0.689		1.93	k= 2, v= 9

s = 1.893
Note: df used for table values are approximate when v > 20.

onion fresh weight
File: 8601iw Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	2	0.358	0.179	0.226
Within (Error)	9	7.124	0.792	
Total	11	7.482		

Critical F value = 4.26 (0.05,2,9)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

onion fresh weight
File: 8601iw Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	control	8.100	8.100		
2	640	8.092	8.092	0.012	
3	1920	8.463	8.463	-0.576	

Dunnett table value = 2.18 (1 Tailed Value, P=0.05, df=9,2)

onion fresh weight
File: 8601iw Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	control	4			
2	640	4	1.372	16.9	0.007
3	1920	4	1.372	16.9	-0.363

onion fresh weight
File: 8601iw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	4	8.100	8.100	8.096
2	640	4	8.092	8.092	8.096
3	1920	4	8.463	8.463	8.463

onion fresh weight
File: 8601iw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
control	8.096				
640	8.096	0.006		1.83	k= 1, v= 9
1920	8.463	0.576		1.93	k= 2, v= 9

s = 0.890
Note: df used for table values are approximate when v > 20.